

WHAT IS CLAIMED IS:

1. A ferritic stainless steel sheet having an average r-value of at least 2.0 and a ferrite crystal grain size number determined according to Japanese Industrial Standard (JIS) G 0552 of at least about 6.0, the ferritic stainless steel sheet comprising, by mass percent:

not more than about 0.1% C, not more than about 1.0% Si, not more than about 1.5% Mn, not more than about 0.06% P, not more than about 0.03% S, about 11% to about 23% Cr, not more than about 2.0% Ni, about 0.5% to about 3.0% Mo, not more than about 1.0% Al, not more than about 0.04% N, at least one of not more than about 0.8% Nb and not more than about 1.0% Ti, and the balance being Fe and unavoidable impurities, satisfying relationship (1):

$$18 \leq \text{Nb}/(\text{C}+\text{N}) + 2\text{Ti}/(\text{C}+\text{N}) \leq 60 \quad (1)$$

wherein C, N, Nb, and Ti in relationship (1) represent the C, N, Nb, and Ti contents by mass percent, respectively.

2. The ferritic stainless steel sheet according to Claim 1, wherein the Cr and Mo contents satisfy the relationship (2):

$$\text{Cr} + 3.3\text{Mo} \geq 18 \quad (2)$$

wherein Cr and Mo represent in relationship (2) represents the Cr and Mo contents by mass percent, respectively.

3. The ferritic stainless steel sheet according to Claim 1, wherein the X-ray integral intensity ratio (222)/(200) at a plane parallel to the sheet surface is not less than about 15.0.

4. The ferritic stainless steel sheet according to Claim 2, wherein the X-ray integral intensity ratio (222)/(200) at a plane parallel to the sheet surface is not less than about 15.0.

5. The ferritic stainless steel sheet according to Claim 1, wherein the ferritic stainless steel sheet is bake-coated with a lubricant coat comprising an acrylic resin, calcium stearate, and polyethylene wax in a coating amount of about 0.5 to about 4.0 g/m².

6. The ferritic stainless steel sheet according to Claim 2, wherein the ferritic stainless steel sheet is bake-coated with a lubricant coat comprising an acrylic resin, calcium stearate, and polyethylene wax in a coating amount of about 0.5 to about 4.0 g/m².

7. The ferritic stainless steel sheet according to Claim 3, wherein the ferritic stainless steel sheet is bake-coated with a lubricant coat comprising an acrylic resin, calcium stearate, and polyethylene wax in a coating amount of about 0.5 to about 4.0 g/m².

8. The ferritic stainless steel sheet according to Claim 4, wherein the ferritic stainless steel sheet is bake-coated with a lubricant coat comprising an acrylic resin, calcium stearate, and polyethylene wax in a coating amount of about 0.5 to about 4.0 g/m².

9. A method for making a ferritic stainless steel sheet, the method comprising the steps of:

preparing a steel slab containing not more than about 0.1% C, not more than about 1.0% Si, not more than about 1.5% Mn, not more than about 0.06% P, not more than about 0.03% S, about 11% to about 23% Cr, not more than about 2.0% Ni, about 0.5% to about 3.0% Mo, not more than about 1.0% Al, not more than about 0.04% N, at least one of not more than about 0.8% Nb and not more than about 1.0% Ti, and the balance being iron (Fe) and unavoidable impurities, satisfying relationship (1):

$$18 \leq \text{Nb}/(\text{C}+\text{N}) + 2\text{Ti}/(\text{C}+\text{N}) \leq 60 \quad (1)$$

where C, N, Nb, and Ti in relationship (1) represent the C, N, Nb, and Ti contents by mass percent, respectively;

heating the steel slab at a temperature in the range of about 1,000°C to about 1,200°C, hot-rough-rolling the steel slab at a rolling temperature of at least one pass of about 850°C to about 1,100°C by a reduction of about 35 %/pass or more, hot-finish-rolling the slab at a rolling temperature of at least one pass of about 650°C to about 900°C by a reduction of about 20 to about 40 %/pass to prepare a hot-rolled sheet;

annealing the hot-rolled sheet at a temperature in the range of about 800°C to about 1,100°C;

cold-rolling the resulting annealed sheet at least twice with intermediate annealing therebetween, said cold rolling being performed at a gross reduction of about 75% or more and a reduction ratio (reduction in the first cold rolling)/(reduction in the final cold rolling) in the range of about 0.7 to about 1.3; and

finish annealing the cold-rolled sheet at a temperature in the range of about 850°C to about 1,050°C.

10. The method for making the ferritic stainless steel sheet according to Claim 9, wherein the Cr and Mo contents in the steel slab satisfy the relationship (2):

$$\text{Cr} + 3.3\text{Mo} \geq 18 \quad (2)$$

wherein Cr and Mo in relationship (2) represent Cr and Mo contents by mass percent, respectively.

11. The method for making the ferritic stainless steel sheet according to Claim 9, wherein the grain size number of ferrite crystal grains of the steel sheet before the final cold rolling measured according to JIS G 0552 is not less than about 6.5.

12. The method for making the ferritic stainless steel sheet according to Claim 10, wherein the grain size number of ferrite crystal grains of the steel sheet before the final cold rolling measured according to JIS G 0552 is not less than about 6.5.

13. The method for making the ferritic stainless steel sheet according to Claim 9, wherein said step of cold rolling is performed in a single direction using a tandem rolling mill comprising a work roller having a diameter of about 300 mm or more.

14. The method for making the ferritic stainless steel sheet according to Claim 10, wherein said step of cold rolling is performed in a single direction using a tandem rolling mill comprising a work roller having a diameter of about 300 mm or more.

15. The method for making the ferritic stainless steel sheet according to Claim 11, wherein said step of cold rolling is performed in a single direction using a tandem rolling mill comprising a work roller having a diameter of about 300 mm or more.

16. The method for making the ferritic stainless steel sheet according to Claim 12, wherein said step of cold rolling is performed in a single direction using a tandem rolling mill comprising a work roller having a diameter of about 300 mm or more.

17. The method for making the ferritic stainless steel sheet according to Claim 13, wherein said step of cold rolling is performed in a single direction using a tandem rolling mill comprising a work roller having a diameter of about 300 mm or more.

18. The method for making the ferritic stainless steel sheet according to Claim 9, further comprising the step of bake-coating the finish-annealed ferritic stainless steel sheet with a lubricant coat comprising an acrylic resin, calcium stearate, and polyethylene wax in a coating amount of about 0.5 to about 4.0 g/m².

19. The method for making the ferritic stainless steel sheet according to Claim 10, further comprising the step of bake-coating the finish-annealed ferritic stainless steel sheet with a lubricant coat comprising an acrylic resin, calcium stearate, and polyethylene wax in a coating amount of about 0.5 to about 4.0 g/m².

20. The method for making the ferritic stainless steel sheet according to Claim 11, further comprising the step of bake-coating the finish-annealed ferritic stainless steel sheet with a lubricant coat comprising an acrylic resin, calcium stearate, and polyethylene wax in a coating amount of about 0.5 to about 4.0 g/m².

21. The method for making the ferritic stainless steel sheet according to Claim 12, further comprising the step of bake-coating the finish-annealed ferritic stainless steel sheet with a lubricant coat comprising an acrylic resin, calcium stearate, and polyethylene wax in a coating amount of about 0.5 to about 4.0 g/m².

22. The method for making the ferritic stainless steel sheet according to Claim 13, further comprising the step of bake-coating the finish-annealed ferritic stainless steel sheet with a lubricant coat comprising an acrylic resin, calcium stearate, and polyethylene wax in a coating amount of about 0.5 to about 4.0 g/m².

23. The method for making the ferritic stainless steel sheet according to Claim 14, further comprising the step of bake-coating the finish-annealed ferritic stainless steel sheet with a lubricant coat comprising an acrylic resin, calcium stearate, and polyethylene wax in a coating amount of about 0.5 to about 4.0 g/m².

24. The method for making the ferritic stainless steel sheet according to Claim 15, further comprising the step of bake-coating the finish-annealed ferritic stainless steel sheet with a lubricant coat comprising an acrylic resin, calcium stearate, and polyethylene wax in a coating amount of about 0.5 to about 4.0 g/m².

25. The method for making the ferritic stainless steel sheet according to Claim 16, further comprising the step of bake-coating the finish-annealed ferritic stainless steel sheet with a lubricant coat comprising an acrylic resin, calcium stearate, and polyethylene wax in a coating amount of about 0.5 to about 4.0 g/m².

26. The method for making the ferritic stainless steel sheet according to Claim 17, further comprising the step of bake-coating the finish-annealed ferritic stainless steel sheet with a lubricant coat comprising an acrylic resin, calcium stearate, and polyethylene wax in a coating amount of about 0.5 to about 4.0 g/m².